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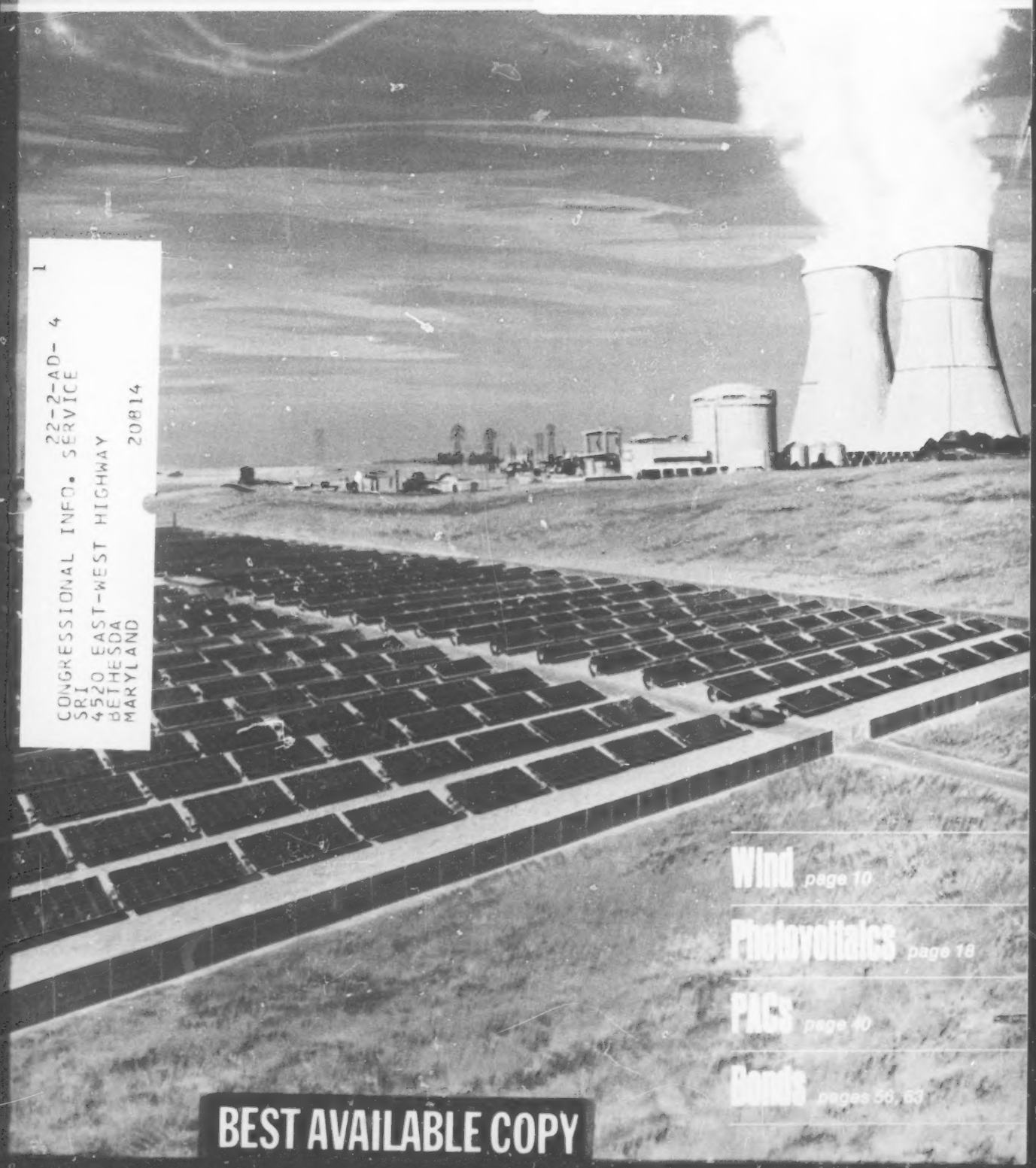

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Life without electricity remains a vivid memory for millions of mature Americans, especially women, and no one has captured the drudgery of those days better than Robert A. Caro in his new book.

FRONT COVER: Sacramento (Cal.) Municipal Utilities District (SMUD) has begun constructing the first megawatt of its photovoltaic system (shown in this drawing). SMUD plans a 100-MW PV system adjacent to its Rancho Seco nuclear plant. Other municipals are also developing photovoltaics, as reported by Steven J. Strong in his article beginning on page 18.

Photo courtesy Acurex Solar Corp.

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PUBLIC POWER *is the official publication of the American Public Power Association. Opinions expressed in signed articles are those of the authors and not necessarily policies of* APPA. *For permission to reprint articles write or call the publisher.*

Editorial Office: 2301 M St. N.W., Washington, D.C. 20037. 202/775-8300

Advertising manager, W. E. (Trez) Lee; *Assistant advertising manager,* Peggy Douglas; *Circulation manager,* Margaret I. Winfough; *Classified advertising manager,* Barbara Opicka, 2301 M St. N.W., Washington, D.C. 20037. 202/775-8300

PUBLIC POWER is published bimonthly. Second-class circulation postage paid at Washington, D.C. Subscription Rate: $25 per yr.; single copy $5. Jan.-Feb. Directory Issue. $20.

PUBLIC POWER is a member of Business Publication Audit of Circulation, Inc. (BPA) and the Society of National Association Publications (SNAP). (USPS-449-420)

than any Congress before it." Bad bills were passed, good ones were killed, but more often than not, members were paralyzed by the fear of antagonizing potential contributors. Also, the electorate was constantly reminded during the 1982 elections of the considerable sums candidates spent on their campaigns. They were clearly turned off by politicians who tried to "buy" elections.

The 98th Congress will certainly be marked by calls for election reforms. For example, Rep. David Obey (D-Wis.) plans legislation that restricts the amount of PAC funds a candidate may receive to $90,000, limits campaign expenditures to $180,000 in the general election, and allows media time for a candidate's response to an attack by an independent political group. Proxmire has introduced similar legislation.

If a balance is not struck, between public and private interests, public financing of campaigns will become more attractive. Presidential candidates already receive public funds in the general election if they represent a major party or demonstrate strong support in the polls. Under Rep. Obey's proposal candidates could have campaign contributions matched by public funds if they and their opponents agree to this financing plan. Chairman Mathias also supports public campaign financing.

The outcome of this debate will be worth watching because, as Drew points out, "what is at stake is the idea of representative government, the soul of this country."

ENERGY PACS EXPANDING

ENERGY PACS PLAY A MAJOR ROLE in "bankrolling" congressional campaigns.

A series of reports by the Citizen/Labor Energy Coalition (CLEC) found oil and gas contributions played "a major role" in the 1982 election. CLEC's October 1982 study showed 196 industry PACs contributed $6.8 million to congressional candidates, surpassing the $6 million given in the 1980 elections. CLEC Director Robert Brandon predicted total 1982 contributions would exceed $8 million. CLEC said energy PAC contributions, as of June 30, 1982, accounted for one out of every five dollars given by corporate PACs, and exceeded contributions made by all independent PACs.

"Contributions by these PACs represent only a portion of the total amount given . . . by oil and gas interests," said CLEC. "Individuals with . . . (such) . . . interests have consistently outspent corporate-sponsored PACs. . . . Through September, more than four . . . of every five dollars spent by these PACs were contributed to candidates outside the oil- and gas-producing states of Texas, Louisiana, and Oklahoma. Thus, these PACs have spent heavily to influence races beyond their geographic base."

Electric utility PACs also have become heavily involved in elections. According to John Shlaes, Edison Electric Institute's (EEI) director of planning, investor-owned utility (IOU) PACs gave candidates an estimated $1.5 million in 1982.

Supplementing these donations, the Edison Electric Institute's PAC, the Constructive Congress Committee, donated $72,275 through November 1982. This far exceeded the $40,150 given in the entire 1980 election. By comparison, ACRE contributed $244,525 in 1979 and 1980, and through late 1982 had given another $400,000.

What's at stake for these groups and who benefits from their contributions?

As Elizabeth Drew describes it, PACs have a "honeylike attraction" to members of the House Energy and Commerce Committee. The committee has jurisdiction over many federal regulatory agencies and a wide range of issues, including transportation, oil and natural gas, electric utilities, environment, health and finance. Transportation, drug/medical and energy PACs gave nearly $1.9 million, $830,000 and $430,000 respectively to committee members. Overall, interest groups donated more than $5.5 million.

Rep. Philip Sharp's (D-Ind.) experience as a senior member of the committee is illustrative. Sharp is chairman of the subcommittee on fossil and synthetic fuels. Because he represents a marginally Democratic district, he agreed to accept PAC contributions from affected industry groups for the first time in 1982. Among those who contributed were pipeline companies, utilities, and producers of oil, gas and coal, including some who supported his opponent. As Sharp said, "By virtue of being a member of the Energy and Commerce Committee, you tend to get that kind of contribution. I think it's clear that because you're chairman of a subcommittee and number six in rank on the (full) committee people on both sides of the issues will contribute."

CLEC found the number of oil and gas PACs has increased substantially since 1976 — from 66 to 196. CLEC said "this growth has been sparked by the industry's ambitious legislative agenda which, in the next Congress, will include natural gas decontrol, taxation of crude oil profits, oil pipeline deregulation, and the Alaska natural gas pipeline."

The CLEC study revealed 12 Senate candidates each received industry contributions totaling more than $60,000. Sens. Lloyd Bentsen (D-Texas), Harrison Schmidt (R-N.M.) and Orrin Hatch (R-Utah) received the most. Seventeen House candidates each got $25,000 from these PACs. Congressmen Phil Gramm (D-Texas), John Rousselot (R-Cal.) and Clint Roberts (R-S.D.), and Mississippi Republican candidate Liles William received the biggest donations. Despite this help, Schmidt, Rousselot, Roberts and Williams lost. (Gramm won then resigned to run as a Republican after House Democrats removed him from a coveted committee position.)

EEI's PAC favored Republicans slightly over Democrats. However, ENERGY DAILY noted EEI "kept its contributions tailored to the distribution of power in Congress." In Senate races, it gave $1,000 to Sens. John Melcher (D-Mont.) and Henry Jackson (D-Wash.), both members of the Energy Committee. On the House side, money went to key members — Reps. John Dingell (D-Mich.), Energy Committee chairman; Don Fuqua (D-Fla.), Science and Technology chairman; and Dan Rostenkowski (D-Ill.), Ways and Means chairman.

EEI and its utility members deviated from this course in one race — the contest between House Energy Conservation and Power Subcommittee Chairman Richard Ottinger (D-N.Y.) and Jon Fossel. Although Fossel received over $8,000 in investor-owned utility industry PAC contributions, he failed to defeat Ottinger.

Finally, rural electric cooperatives made their interests known in Congress, particularly on a Reagan administration proposal to cut off Federal Financing Bank low-interest loans. Although ACRE's contributions were heavily Democratic, ACRE has helped supportive Republicans. NRECA gained bipartisan support to defeat the administration's proposal.

TED HANDEL

CONTRIBUTIONS BY THE 10 LARGEST IOU PACs
During the 1982 Election Campaign

Utility	*Amount**
Southern California Edison	$119,750
Consumers Power	60,665
Consolidated Edison of New York	53,025
Florida Power and Light	50,450
Carolina Power and Light	45,910
Houston Industries	38,700
El Paso Electric	37,995
Long Island Lighting	31,721
Texas Electric Service	29,150
Baltimore Gas and Electric	27,650

Source: Federal Election Commission

*Note: This represents the amount given by the PAC to federal and state candidates and other political committees.

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Public Power Bond Issues Up 35%

LOCAL PUBLICLY OWNED ELECTRIC utilities issued a record $9.2 billion worth of electric revenue bonds in 1982. This was a 35 percent increase from the $6.8 billion they sold in 1981, which had been a 46 percent increase over the $4.66 billion sold in 1980.

All tax-exempt bond sales, which had decreased by 2 percent to $45.3 billion in 1981, increased by 65 percent to $74.9 billion last year.

Public power revenue bonds amounted to 12.3 percent of all tax-exempt bonds sold in 1982, compared with about 15 percent in 1981 and 10 percent in 1980, according to Lehman Brothers Kuhn Loeb's annual compilations of tax-exempt bonds.

The two joint-action agencies which issued more than $1 billion in bonds last year were Washington Public Power Supply System (WPPSS), with $1.53 billion, and North Carolina Eastern Municipal Power Agency, with $1.3 billion. WPPSS also placed the largest single issue last year, $850 million, on Feb. 11.

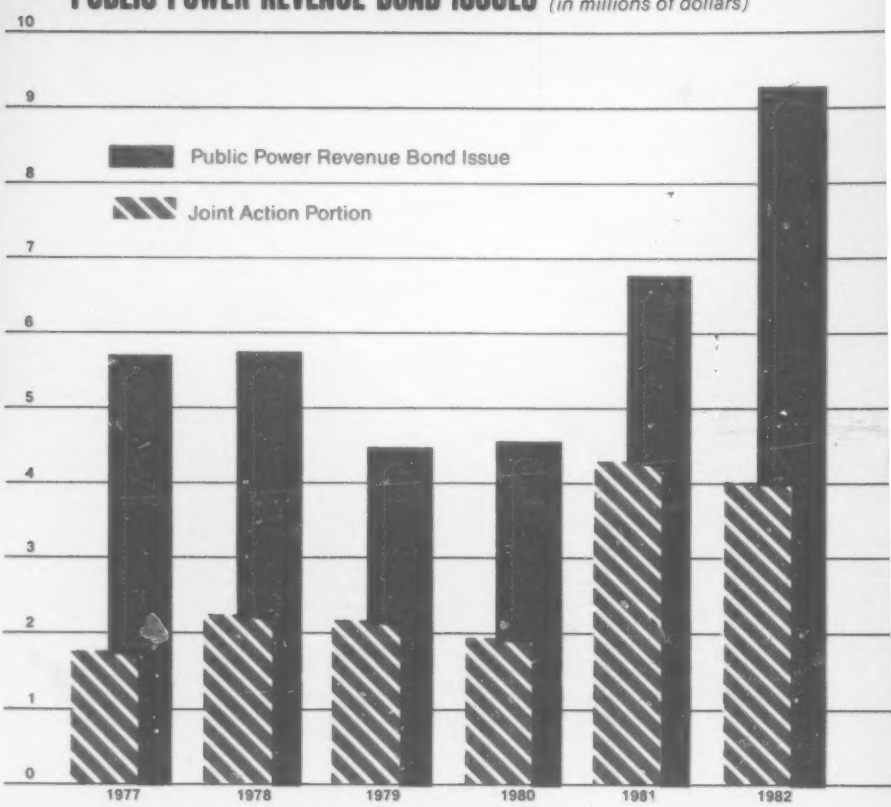
Joint-action agencies accounted for $5.2 billion of the $9.2 billion public power bond total, more than 56 percent, as compared with 63 percent of the public power total in 1981 and 42 percent in 1980.

The eight-year total of electric revenue bonds issued by 25 joint-action agencies totals $19.1 billion, an increase of 38 percent over the $13.8 billion issued by 19 joint-action agencies through 1981.

About 42 percent of the $19.1 billion—$8.1 billion—has been issued by WPPSS. The six agencies which issued bonds for the first time last year are Connecticut Municipal Electric Energy Cooperative, Louisiana Energy and Power Authority, North Carolina Eastern Municipal Power Agency, Southern California Public Power Authority, Utah Associated Municipal Power System and the Vermont Public Power Supply Authority.

Sixty-two of the public power issues last year, totaling $7.9 billion, were negotiated; 57 issues, totalling $1.3 billion, were competitive. Within these totals, joint-action agencies negotiated 24 issues totalling $5.2 billion. Only one joint-action issue, for $2.3 million, was competitive. In 1981, 16 joint-action agency issues were negotiated and five were competitive.

PUBLIC POWER REVENUE BOND ISSUES *(in millions of dollars)*



Total Bonds Issued by Joint-Action Public Power Systems

Issuer	1975–1982	Total (000)
Connecticut Municipal Electric Energy Cooperative		$ 43,000
Heartland Consumers Power District		240,100
Intermountain Power Agency		1,500,000
Kansas Municipal Energy Agency		22,885
Louisiana Energy and Power Authority		109,515
Massachusetts Municipal Electric System		26,100
Massachusetts Municipal Wholesale Electric Co.		1,117,870
Michigan Public Power Agency		44,370
Michigan South Central Power Agency		95,040
Mississippi Municipal Energy Agency		3,300
Municipal Electric Authority of Georgia		1,425,000
North Carolina Municipal Power Agency Number 1		1,275,000
North Carolina Eastern Municipal Power Agency		1,300,000
Northern California Power Agency		55,000
Northern Municipal Power Agency		268,000
Platte River Power Authority		652,100
Sam Rayburn Municipal Power Agency		319,390
City of Sikeston, Mo.		250,000
Southern California Public Power Authority		720,000
Texas Municipal Power Agency		1,226,300
Utah Associated Municipal Power System		66,000
Vermont Public Power Supply Authority		25,500
Washington Public Power Supply System		8,120,000
Western Minnesota Municipal Power Agency		164,850
Wyoming Municipal Power Agency		21,540
8-Year Total		$19,090,860

Public power revenue bond sales by quarter, in millions of dollars, were:

Quarter	1980	1981	1982
1st	$701	$1,432	$2,611
2nd	770	1,676	2,143
3rd	2,340	2,256	1,425
4th	844	1,442	3,067

MAY-JUNE 1983

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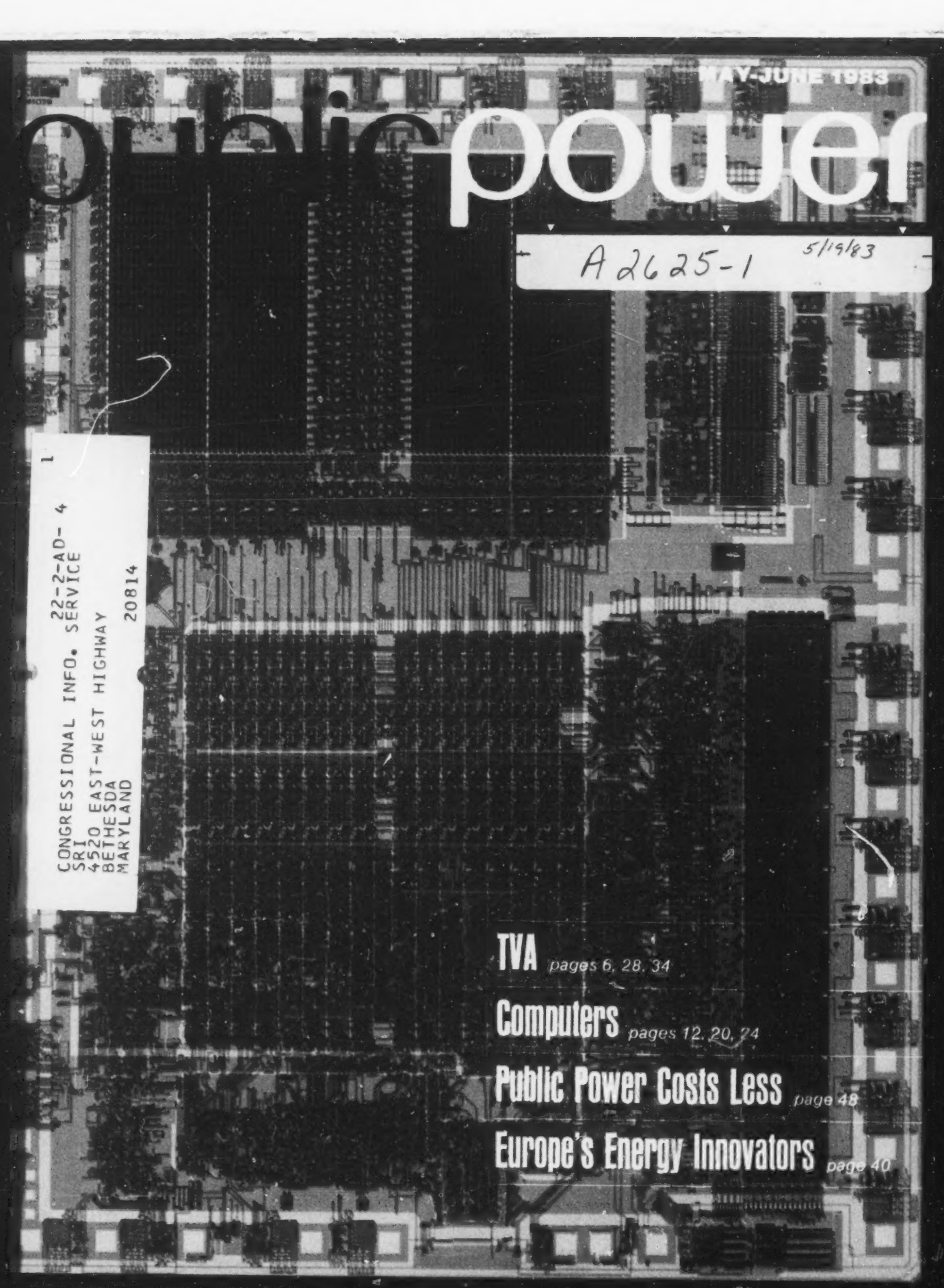

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Success depends on training, communications and maintaining and updating the system.

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"Despite all of Roosevelt's verbal flourishes or Arthur Morgan's wistful hopes, TVA remained close to the agency envisioned in Senator Norris' old Muscle Shoals bill."

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European municipals lead in waste heat recovery, district heating, synthetic fuel production, cogeneration, refuse conversion and fiber optics.

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"Average residential revenue for investor-owned utilities in 1981 was 6.2 cents per kWh, 43.5 percent higher than the public systems' average of 4.32 cents per kWh."

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"Communities considering selling their municipal electric utility, as well as those planning for public power, need a true picture of the utility's value."

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"Tried and tested actions can protect interests of your system and customers."

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"Cost of treatment is estimated to be about one-tenth the cost of replacing cable."

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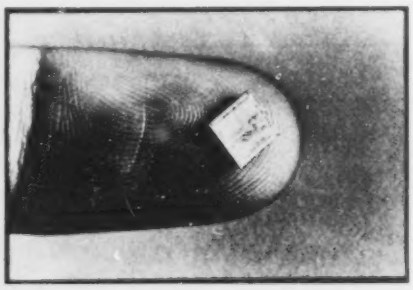
"FERC decisions are substantially affecting public power systems and their ability to compete effectively with the larger private utilities."



FRONT COVER: The magnified 16-bit TMS9995 microprocessor chip on the cover is actually about the size of the chip on a finger in the photo above. The products and pictures were produced by Texas Instruments Inc., which is conducting a seminar on microcomputer basics prior to APPA's microcomputer applications workshop in Dallas, Texas, May 24-26.

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Computer Use Expands Among APPA Systems

by MICHAEL K. BERGMAN, *environmental editor,* PUBLIC POWER, *and* APPA *staff scientist*

COMPUTERS OFFER COST SAVINGS, productivity increases and the ability to perform new tasks. The public power systems which responded to the third APPA computer survey say the rate of computer acquisition by public power systems has been increasing rapidly and these machines are performing a widening variety of tasks. Use of small microcomputers has grown phenomenally — at an annual growth rate of almost 200 percent since 1977.

APPA's 1982-83 survey drew responses from 216 public power systems which own 384 computers and 6,250 remote job terminals. Public power systems use these computers for scores of tasks ranging from billing to monitoring power plants. The current survey and two earlier ones show that more than 350 public power systems use computers for office automation, administration, operations, systems planning, engineering and support.

Figure 1 shows the constant growth rate in computer installations by public power systems since 1974. Though some older computers now in use were installed as early as 1962, only nine machines were acquired before 1974. With numbers of installed microcomputers accelerating, rapid growth in computer use should continue.

The relative distribution among microcomputers, stand-alone systems, minis and mainframes is shown in Figure 2. Loosely defined, minicomputers and the larger "super-minis" fit into the categories in Figure 2 indicating two to 48 terminals and in the "other" category. Thus, microcomputers now represent close to 25 percent of the machines reported, mainframes about 5 percent; the medium-sized minicomputers account for the remaining 70 percent or so.

An increase in hardware vendors is another consequence of rapidly changing technology. Traditional vendors such as IBM, Hewlett-Packard, Burroughs, Digital Equipment and NCR are still dominant, but many new vendors have entered the market in the last few years.

Market share by vendor is shown in Table 1 below:

TABLE 1

Total number installed computers	384
Total number hardware vendors	39
Percent Share	
IBM	26%
Hewlett-Packard	16
Burroughs	9
Apple	9
NCR	7
DEC	6
Data General	4
Prime	3
31 other manufacturers	20

The market shares of both Apple and Hewlett-Packard are large because single utilities have made multiple purchases. In the case of Apple, individual utilities have bought as many as eight or nine machines apiece. For Hewlett-Packard, one utility has 25 HP125s and another has nine Model 2108s. If a single utility reported multiple computers all machines often came from the same vendor.

Apple, Hewlett-Packard, Radio Shack and IBM are the most popular microcomputers with Apple alone accounting for one-third of the market. All told, 17 vendors have sold microcomputers to public power systems responding to the APPA survey. Proliferation of microcomputer vendors should enhance competition.

Figure 1. Number of Computers Installed by Public Power Systems

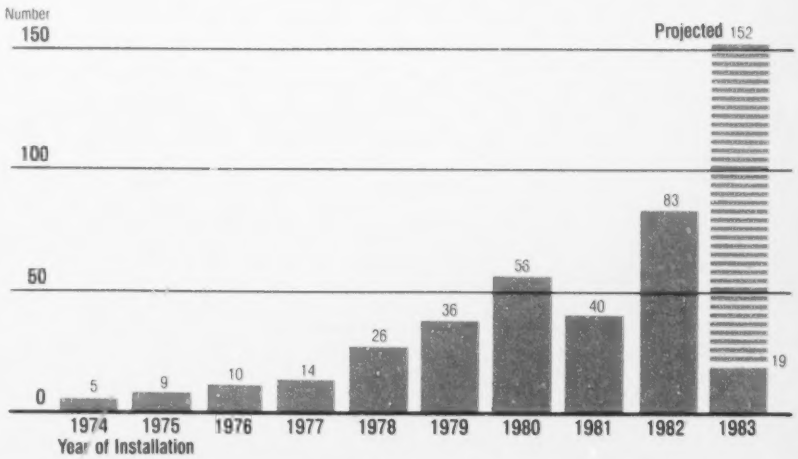


Figure 2. Number of Terminals per Computer

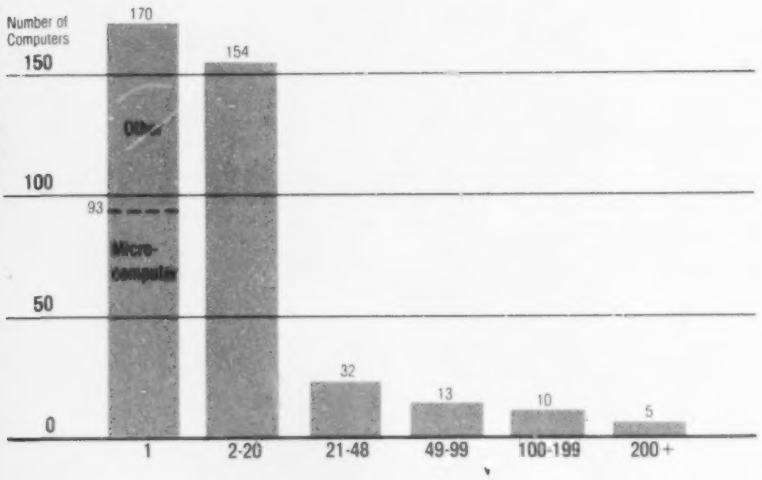
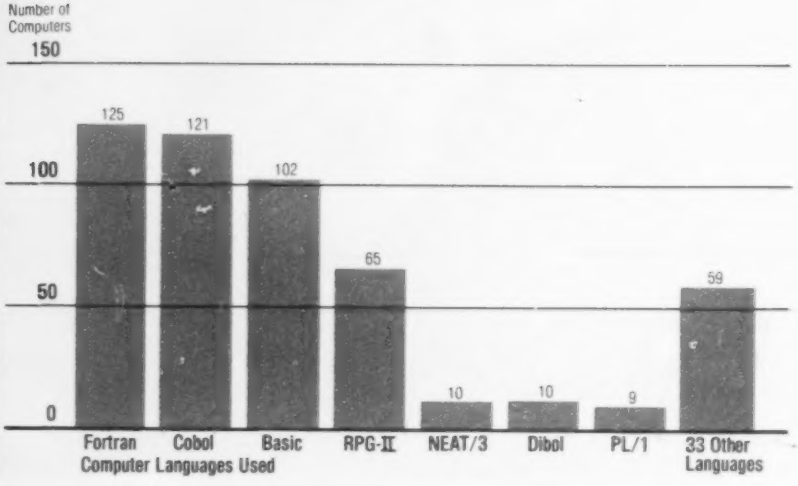


Figure 3. Occurrence of Computer Languages



Standards Needed

Lack of standardization still plagues the developing computer industry. Because of the extreme diversity of operating systems — that is, the way computers handle internal tasks and communicate with peripherals — no attempt has been made to compile individual survey responses. But even on the more uniform level of software languages there is substantial diversity.

Figure 3 shows that Fortran, Cobal and Basic are the three most popular software languages. More than 40 software languages, however, are used by public power computers, 20 on only one machine. This diversity in language results mainly because certain hardware vendors offer their own languages. Combined with the diversity in operating systems, the prospects for the substantial sharing of software among public power systems appear dim for now.

The justification for acquiring a computer depends on the tasks it can perform. Combined, total computer time as reported breaks down as follows:

Operations	52%
Administration	31%
Engineering and support	12%
System planning	5%

Only the areas of administration, operations and engineering and support had computers devoted exclusively to their application. Interestingly, use of computers for systems planning and engineering applications has been rapidly increasing in recent years, due in large measure to the greater use of microcomputers.

More than 30 different software applications were noted in the surveys; the most popular software, by far, dealt with billing, payroll, general ledger and equipment inventory. These same programs were also more likely to have been developed and maintained in-house.

The summary of software applications is shown in Table 2 (with number of programs developed and maintained in-house by survey respondents in parenthesis).

TABLE 2

OPERATIONS	
Dispatch	31 (5)
Vehicle maintenance	12 (9)
Maintenance scheduling	25 (7)
Bulk power transmission/ purchases	24 (4)
SCADA	9 (2)
Meter reading/inventory	8 (3)
ADMINISTRATION	
Billing	183 (75)
Payroll	160 (54)
Budgeting	116 (18)
General ledger/cost accounting	111 (43)
Financial planning	85 (13)
Miscellaneous	76 (10)
Procurements	38 (7)
Materials	12 (10)
Property records	5 (4)
Assessments	4 (3)
SYSTEMS PLANNING	
Load forecasting	50 (9)
Statistical analysis	49 (5)
Production costing	25 (4)
Capacity expansion	21 (2)
Rate design/analysis	7 (3)
ENGINEERING AND SUPPORT	
Equipment inventory	74 (30)
Load flow and fault analysis	43 (9)
Load research	41 (6)
Cost of services	40 (5)
Project management	31 (5)
Distribution planning	29 (2)
Air quality reporting	10 (4)
Load management	9 (2)
Energy management/audit	8 (7)
Generation monitoring	8 (5)
OTHER	22 (15)

In addition to these in-house computer capabilities, 56 utilities reported they subscribed to time-sharing services — frequently with local universities for specialized computing. Thirty-one time-sharing vendors were reported: none of them dominated the market. Most utilities reported connection rates with time-sharing services at speeds of 300 or 1,200 baud. (A baud is one bit per second.) Several utilities reported spending more than $5,000 a month for time-sharing.

Individual survey responses, cross-indices by utility to hardware and software, and additional summary results will be available in the forthcoming report, "APPA's 1982-1983 Computer Survey." Copies will be available from the APPA publications department.

public power costs less

IOU residential rates averaged 43.5% higher in 1981

by **JEANNIE KILMER**, *contributing editor, PUBLIC POWER, and APPA manager of statistics and data processing*

LATEST OFFICIAL FIGURES demonstrate once again that the consumer-owners of the nation's local publicly owned electric utilities enjoy electric rates significantly lower than those paid by customers of private power companies.

Comparative statistics for 1981, just published by the Department of Energy's Energy Information Administration (EIA) continue the annual electric utility industry statistical series begun by the former Federal Power Commission in 1946. Each report has shown that the local publicly owned segment of the pluralistic electric utility industry has been the leader in providing consumers with lower cost power.

The data appear in EIA's publications of statistics for electric utilities, privately owned and publicly owned. These reports represent nearly 100 percent of the investor-owned utilities (IOUs) and a lesser portion of the publicly owned systems. EIA's statistics for 1981 cover 204 private power companies and 162 local publicly owned electric utilities. EIA statistics for publicly owned utilities have been supplemented with data for an additional 110 municipal utilities published in "1981 TVA Power Program Summary, Volume II." These 110 utilities were included in the EIA or FPC reports for 1978 and earlier years.

The average residential consumer in a local public power system used 25.5 percent more electricity in 1981 than the average residential customer of the private power companies — 10,391 kWh to 8,277 kWh. But the public power consumer paid 14.3 percent less on the average for 25.5 percent greater annual consumption — $448.79 to $513.11. Average residential revenue for the companies in 1981 was 6.20 cents per kWh, 43.5 percent higher than the public systems' average of 4.32 cents per kWh. Or, to phrase it differently, average residential rates paid by public power customers were 30.3 percent below the average paid by customers of IOUs.

SALES: TO RESIDENTIAL CONSUMERS[1]

	Average Annual kwh Consumption		*Average Revenue Per kwh (cents)*		*Average Annual Bill (dollars)*	
	Private	*Public*	*Private*	*Public*	*Private*	*Public*
1946	1,298	1,739	3.29	2.32	42.67	40.32
1950	1,767	2,518	2.95	1.99	52.14	50.06
1955	2,573	3,824	2.76	1.69	70.97	64.63
1960	3,454	5,208	2.62	1.58	90.51	82.46
1965	4,618	6,634	2.39	1.53	110.53	101.26
1966	4,931	7,007	2.34	1.50	115.37	105.13
1967	5,220	7,317	2.31	1.49	120.38	108.90
1968	5,706	7,880	2.28	1.47	128.43	115.93
1969	6,246	8,546	2.21	1.45	137.99	123.90
1970	6,700	9,015	2.22	1.47	148.92	132.89
1971	7,039	9,378	2.32	1.56	163.08	146.47
1972	7,391	9,630	2.42	1.63	178.96	156.95
1973	7,742	10,080	2.54	1.70	196.54	170.80
1974	7,550	9,797	3.10	1.94	233.85	190.54
1975	7,830	10,125	3.51	2.33	275.17	236.19
1976	7,840	9,539	3.78	2.79	295.94	265.76
1977	8,256	10,791	4.06	2.79	334.92	300.91
1978	8,453	11,383	4.31	3.00	364.35	341.23
1979	8,319	10,940	4.64	3.22	385.70	352.43
1980	8,531	10,744	5.36	3.77	457.23	405.07
1981	8,277	10,391	6.20	4.32	513.11	448.79

TO COMMERCIAL AND INDUSTRIAL CONSUMERS[1]

	Average Annual kwh Consumption		*Average Revenue Per kwh (cents)*		*Average Annual Bill (dollars)*	
	Private	*Public*	*Private*	*Public*	*Private*	*Public*
1946	28,110	22,475	1.50	1.29	421.55	289.24
1950	33,653	25,124	1.54	1.33	518.55	334.40
1955	49,038	38,329	1.45	1.19	711.04	457.55
1960	61,944	49,421	1.49	1.22	922.71	604.69
1965	79,201	66,396	1.40	1.18	1,109.26	783.93
1966	85,265	70,557	1.37	1.16	1,168.58	818.81
1967	89,347	74,373	1.37	1.16	1,224.13	865.43
1968	96,332	79,687	1.36	1.15	1,307.14	916.71
1969	102,965	85,683	1.36	1.15	1,395.61	983.24
1970	107,041	89,653	1.40	1.17	1,502.43	1,052.87
1971	110,973	92,778	1.50	1.26	1,671.12	1,170.33
1972	117,793	98,384	1.58	1.31	1,863.05	1,294.31
1973	124,082	103,785	1.68	1.40	2,083.46	1,449.28
1974	121,112	102,974	2.19	1.64	2,655.04	1,693.43
1975	119,381	110,076	2.62	1.97	3,127.77	2,178.01
1976	125,296	111,414	2.82	2.38	3,531.09	2,654.90
1977	130,602	124,331	3.12	2.38	4,076.98	2,954.33
1978	132,610	129,874	3.39	2.65	4,497.61	3,444.14
1979	133,355	129,342	3.66	2.88	4,877.69	3,722.15
1980	129,499	124,586	4.38	3.41	5,673.85	4,251.19
1981	129,022	126,429	5.07	3.88	6,542.72	4,902.13

[1]*Care should be taken in the use of this data due to year-to-year variations in sample size.*

1.88¢ per kWh Difference

Thus, on the average, residential customers of the private power companies paid 1.88 cents more for each kWh of electricity used in 1981 than consumers served by local publicly owned electric utilities. In 1980 the spread was 1.59 cents per kWh.

Revenue per kWh of electricity sold to residential consumers increased in 1981 for both the privately owned and publicly owned electric utilities. In the case of the public systems, revenue per kWh of residential use went up from 3.77 cents per kWh in 1980 to 4.32 cents per kWh in 1981. For the private companies, average revenue per kWh of electricity sold to residential customers climbed from 5.36 cents to 6.20 cents in 1981.

In 1981 the average commercial or industrial customer of a private power company used 3.6 percent more power than the average commercial or industrial user served by a local public power system (129,022 kWh to 126,429 kWh). But the private utility average customer's annual bill was 33.5 percent more ($6,543 to $4,902).

Average commercial and industrial revenue for the privately owned companies, 5.07 cents per kWh, was 30.7 percent higher than the 3.88 cents per kWh for the publicly owned systems.

Average commercial and industrial revenue per kWh was higher in 1981 than in 1980 for both the private and publicly owned utilities — up from 4.38 cents to 5.07 cents per kWh for the companies, and from 3.41 cents to 3.88 cents per kWh for the public systems.

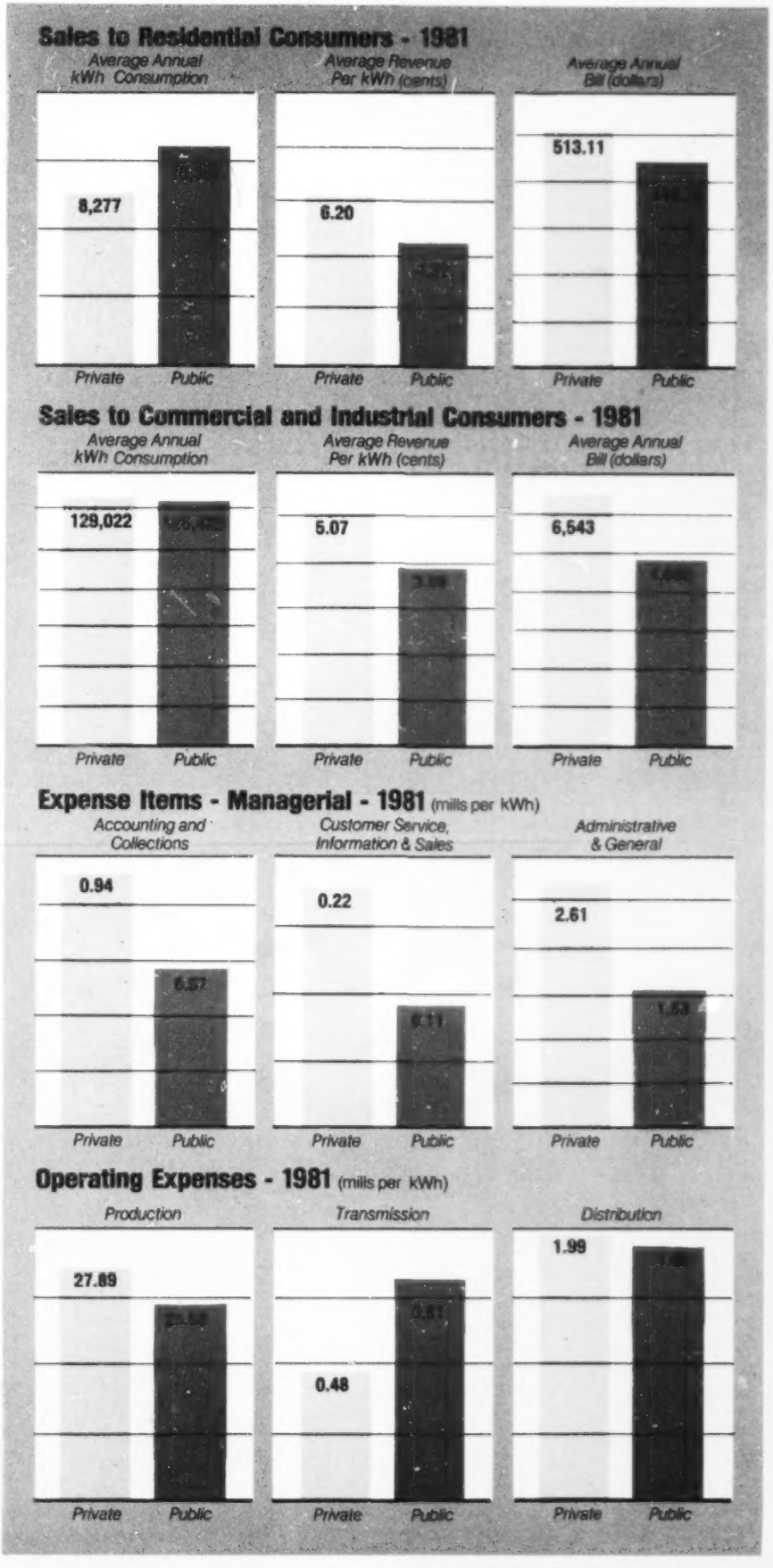
IOU Expenses Higher

Administrative and general expenses reported by the public systems were lower than the private power companies' on the basis of expense per $100 of revenue ($4.22 to $5.05) and on the basis of kWh sold (1.53 mills per kWh for the publicly owned systems compared to 2.61 mills per kWh for the companies).

Accounting and collections per customer cost the investor-owned utilities $25.82 in 1981, compared with $20.87 for the publicly owned utilities. This cost was $3.31 higher than 1980 for the IOUs and rose $2.47 for the public systems.

On the basis of kWh sales, accounting and collections cost the companies 0.94 mills per kWh, compared with 0.57 mills per kWh for publicly owned utilities.

In 1981, the private power companies spent 42 cents of each $100 of revenue for customer service, information and sales expenses (previously reported as promotion and advertising expenses), up five cents



from 1980; the publicly owned systems spent 31 cents of each $100 of revenue for this item, up three cents from the previous year.

Customer service, information and sales expenses of the companies were 0.22 mills per kWh sold, compared with 0.11 mills for the public power systems.

Production Costs Up

Production costs per kWh were lower in the public systems than the companies in 1981, for the 12th consecutive year. In 1981, both the privately owned utilities and the public power systems experienced sharp increases in production costs over the previous year: from 24.14 mills per kWh in 1980 to 27.89 mills per kWh in 1981 for the companies; and from 20.16 mills per kWh to 23.53 mills per kWh in 1981 for the publicly owned utilities.

Distribution expenses per customer rose for both types of systems in 1981 — from $41.90 in 1980 to $45.19 in 1981 for the companies, and from $44.83 in 1980 to $48.97 in 1981 for the public systems. Distribution expenses for the companies was 1.99 mills per kWh sold to ultimate customers, compared to 1.90 mills per kWh sold to ultimate customers by the publicly owned utilities.

For the fifth year since the federal statistics have been published, IOU transmission costs were lower. In 1981 their transmission expenses per kWh rose to 0.46 mills, up from 0.43 mills in 1980 and 0.40 mills in 1979; the public systems' transmission costs in 1981 were 0.81 mills per kWh, up from 0.68 mills in 1980 and 0.67 mills in 1979.

The publicly owned electric utilities had electric operating revenue of 3.63 cents per kWh sold in 1981, while the privately owned electric utilities had operating revenues of 5.16 cents per kWh. The private companies had net interest charges which equaled 0.46 cents for each kWh sold and dividends on preferred and common stock equal to, respectively, 0.11 cents and 0.39 cents per kWh sold. The publicly owned utilities had total income deduction equal to 0.50 cents per kWh sold in 1981.

The cost of debt and equity capital for the privately owned utilities was equal to 16.1 percent of operating revenue. The public systems, which do not pay dividends to private stockholders, paid the equivalent of 13.9 percent of their operating revenue as interest on long-term debt and for other income deductions.

These latest statistical reports show that in 1981, as in the previous 35 years since the comparative statistics have been published, the local publicly owned electric utilities are leading the industry in providing economical electric service to consumers.

EXPENSE ITEMS

OPERATIONS

	Production *Per kwh Sold (in mills)*		Transmission *Per kwh Sold (in mills)*		Distribution *Per Customer (in dollars)*	
	Private	*Public*	*Private*	*Public*	*Private*	*Public*
1946	4.35	4.30	.27	.14	9.37	9.19
1950	4.96	4.68	.26	.13	12.04	11.77
1955	4.42	4.68	.26	.13	14.18	13.79
1960	4.20	4.70	.25	.15	16.19	10.24
1965	3.98	4.34	.21	.15	17.48	17.93
1966	4.01	4.36	.21	.16	17.84	18.54
1967	4.03	4.31	.21	.15	18.67	19.37
1968	4.09	4.16	.21	.15	19.31	20.43
1969	4.21	4.23	.22	.13	20.56	22.88
1970	4.76	4.61	.23	.15	22.14	24.15
1971	5.49	5.25	.24	.16	22.82	25.41
1972	5.97	5.71	.25	.16	24.13	26.02
1973	6.70	6.47	.26	.17	25.52	27.53
1974	10.72	8.01	.29	.18	26.46	29.98
1975	12.70	9.35	.31	.21	27.63	31.78
1976	13.73	12.04	.34	.29	29.51	34.18
1977	15.87	13.28	.35	.54	31.76	33.78
1978	17.27	14.37	.37	.64	34.81	35.94
1979	19.69	16.32	.40	.67	37.68	38.17
1980	24.14	20.16	.43	.68	41.90	44.83
1981	27.89	23.53	.48	.81	45.19	48.97

MANAGERIAL

	Accounting and Collections Per Customer (in dollars)		*Customer Service Information and Sales Per $100 Revenue (in dollars)*		*Administrative and General Per $100 Revenue (in dollars)*	
	Private	*Public*	*Private*	*Public*	*Private*	*Public*
1946	3.73	2.82	1.77	1.03	7.22	6.11
1950	4.44	3.35	1.79	1.11	7.90	6.85
1955	5.33	4.00	1.73	.95	6.73	6.59
1960	6.38	4.94	1.70	1.04	6.29	6.31
1965	7.06	6.15	1.79	1.14	6.23	5.80
1966	7.18	6.13	1.83	1.09	6.00	5.84
1967	7.34	6.48	1.79	1.10	5.87	6.23
1968	7.68	6.78	1.75	1.10	5.70	6.10
1969	8.11	7.36	1.69	1.08	5.74	6.08
1970	8.86	7.98	1.54	1.01	5.87	6.25
1971	9.61	8.77	1.30	.89	5.84	6.06
1972	10.31	9.18	1.00	.80	5.88	5.95
1973	11.33	9.55	.74	.67	5.78	5.79
1974	13.26	10.61	.42	.50	5.19	5.65
1975	15.25	12.33	.30	.35	4.98	5.14
1976	16.34	14.50	.27*	.28	4.99	5.09
1977	17.17	12.75	.36	.22	4.94	4.68
1978	18.59	15.87	.36	.22	5.11	4.64
1979	20.25	16.41	.38	.29	5.21	4.24
1980	22.51	18.40	.37	.28	5.08	4.45
1981	25.82	20.87	.42	.31	5.05	4.22

(*) "Customer Service, Information and Sales" was formerly listed as "Promotion and Advertising." The 1976 and subsequent annual figures reflect a federal reporting change which combined sales expenses with customer service and information expenses.

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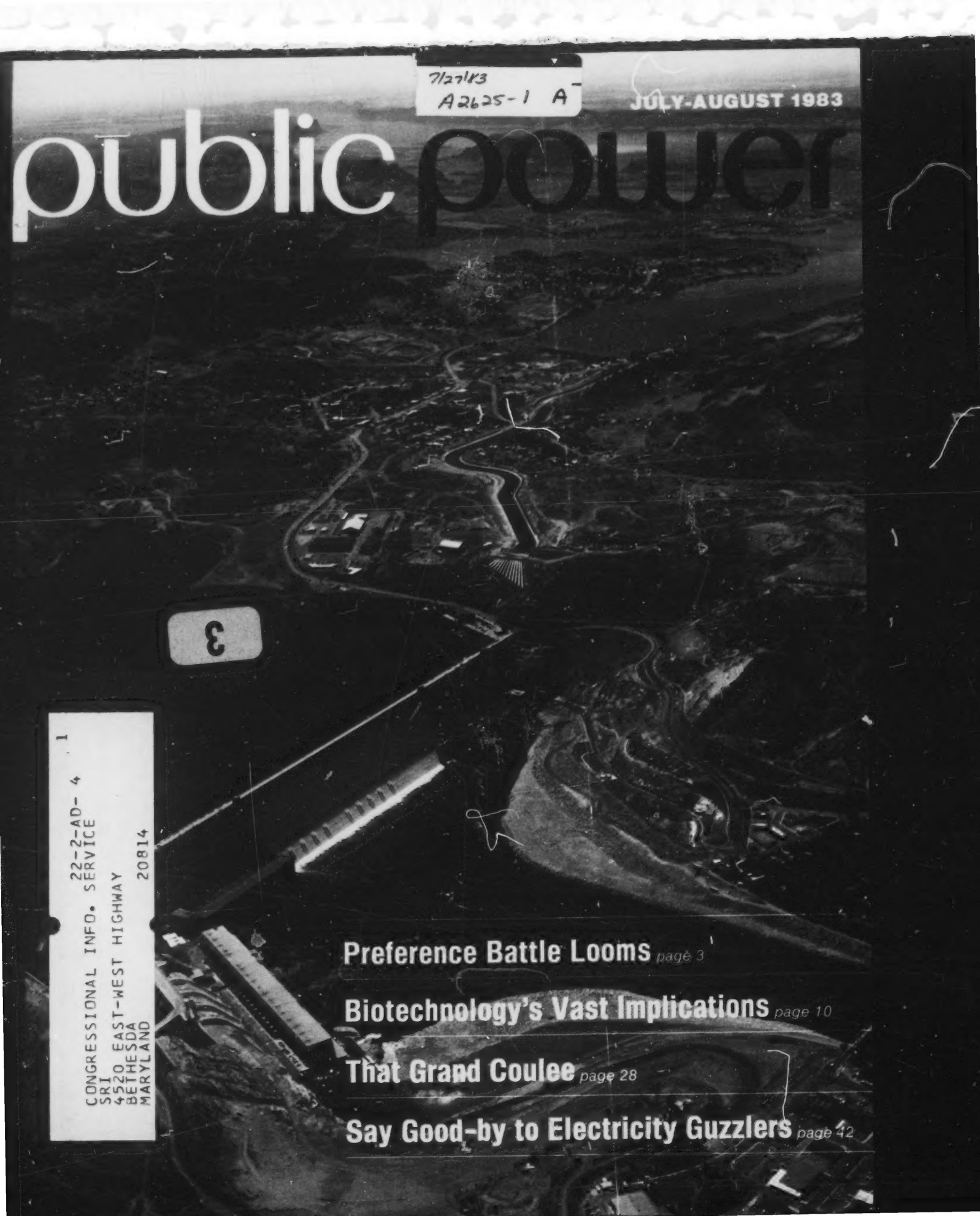
public power



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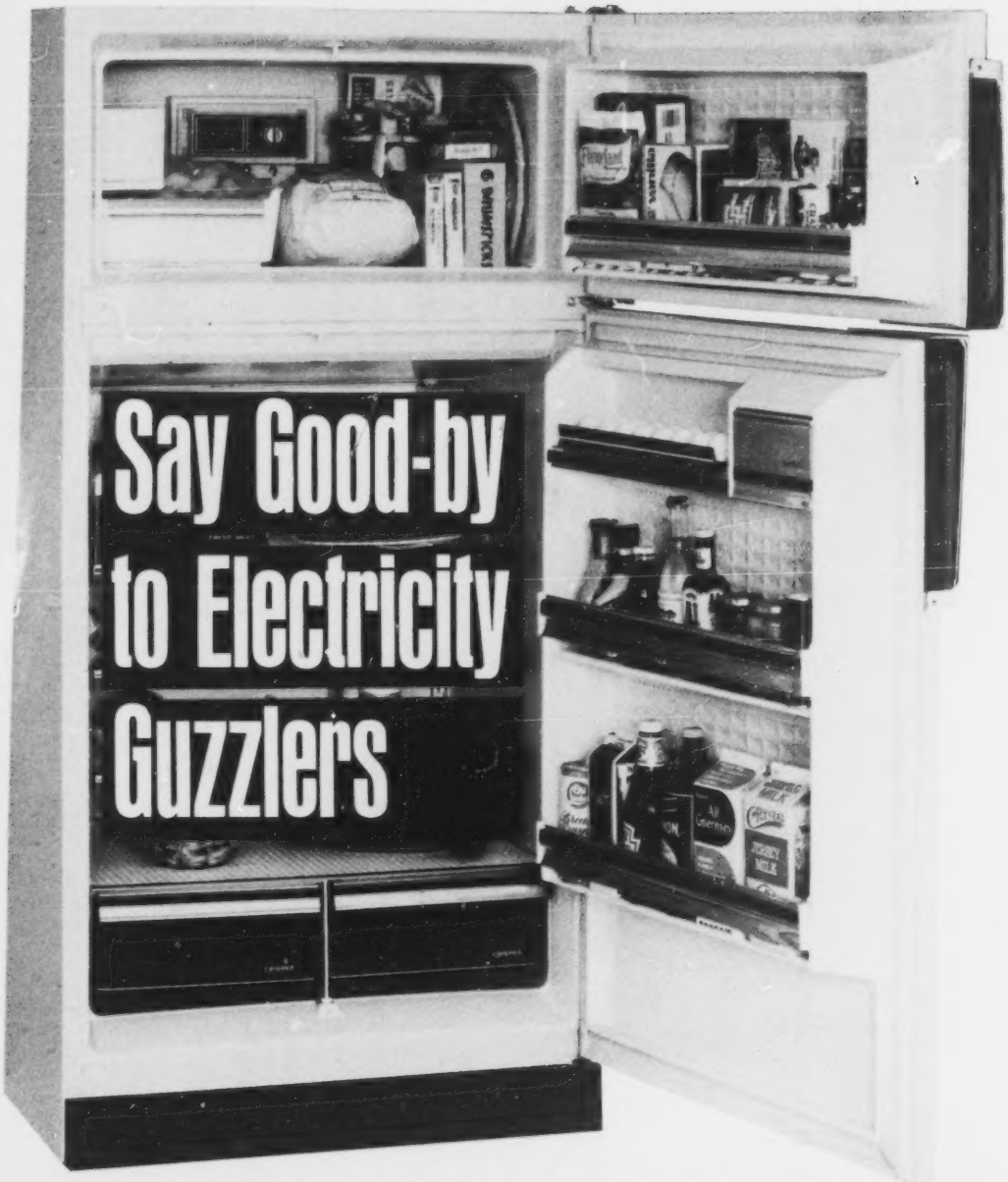
Editorial Office: 2301 M St. N.W., Washington, D.C. 20037. 202/775-8300

Advertising manager, W. E. (Trez) Lee; *Assistant advertising manager,* Peggy Douglas; *Circulation manager,* Margaret I. Winfough; *Classified advertising manager,* Barbara Opicka; 2301 M St. N.W., Washington, D.C. 20037. 202/775-8300

PUBLIC POWER is published bimonthly. Second-class circulation postage paid at Washington, D.C. Subscription Rate: $25 per yr.; single copy $5. Jan.-Feb. Directory Issue. $20.

PUBLIC POWER is a member of Business Publication Audit of Circulation, Inc. (BPA) and the Society of National Association Publications (SNAP). (USPS-449-420)



The top-rated Amana TSC-18E frost-free refrigerator/freezer costs only about $100 more than a standard model, but its annual operating cost is about $30 lower than that of the standard model for a typical consumer.

Say Good-by to Electricity Guzzlers

by HOWARD S. GELLER

THE COST OF OPERATING residential appliances has become a major expense. A typical household paying seven cents per kWh will spend more than $700 a year operating a refrigerator, freezer, electric water heater, range, clothes washer and dryer, lights and other electrical appliances. Heating and air conditioning could add another $800 or more per year in a typical all-electric home. Moreover, the energy cost for operating appliances over their useful life is a number of times greater than their first cost.

From the national perspective, residential appliances and heating and cooling equipment consumed one-third of the electricity produced in the United States during 1980. Refrigerators alone use the output of about 25 large 1,000-MW power plants, nearly 7 percent of the nation's total electricity consumption and more than 50 percent of U.S. nuclear power generation. Residential air conditioners place enormous demands on peak generating capability and use this capacity very inefficiently.

What can consumers and electric utilities do about this situation? Surprisingly, a great deal. Consumers through informed purchase decisions and utilities through creative, well-designed programs can substantially reduce the operating cost and power demand from residential equipment.

Efficiency Varies 100% Or More

When purchasing appliances, consumers can select from models which vary greatly in

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Geller is a research associate at the American Council for an Energy-Efficient Economy (ACEEE). Its new handbook for energy officials, "ENERGY-EFFICIENT APPLIANCES," is available from ACEEE, 1001 Connecticut Ave. N.W., Suite 530, Washington D.C. 20036.

efficiency and energy consumption. For refrigerators, air conditioners and water heaters, similar models, in terms of service and features, differ in efficiency by up to 100 percent or more.

Table I lists the highly efficient top-rated models already available and their efficiencies in comparison with typical models sold in 1980. The performance values are based on standardized testing procedures established by the Department of Energy. Clearly, residential electricity demand would be much reduced if consumers purchased available low-energy models.

The refrigerator/freezer demonstrates what can be accomplished through a series of fairly modest design changes. In the early 1970s, the standard frost-free, 16-cubic-foot refrigerator/freezer was an "electricity guzzler" consuming about 1,700 kWh per year. In contrast, the top-rated frost-free refrigerator/freezer in early 1983 (an 18-cubic-foot model made by Amana) consumes only about 870 kWh per year. The high-efficiency model boasts separate refrigerator and freezer cooling units, three-inch polyurethane foam insulation around the freezer, up to two and one-fourth inches of foam around the refrigerator, an improved door seal, a more efficient condenser fan motor, and natural convection air circulation in the refrigerator. Isolating the air in the refrigerator and freezer keeps food fresher and moister besides reducing operation of defrost heaters.

The major gain in electric water-heating efficiency was made possible by the heat-pump water-heater (HPWH). This device functions like a refrigerator or air conditioner, using a compressor to move heat from a cooler to a warmer region. Heat-pump water-heaters are most attractive in hot climates where heat withdrawn from indoor air is beneficial much of the year. In northern parts of the United States, an HPWH in an unheated basement can still save 30 percent or more of the electricity which a resistance water-heater would use. The top-rated HPWH consumes only about 35 percent as much electricity as the standard electric water-heater of the late 1970s.

For air conditioners and heat pumps, large improvements in overall efficiency have been achieved through design modifications and better components. These include larger condenser and evaporator coils, more efficient motors, oversized, derated compressors and improved controls.

One problem with most air conditioners and heat pumps is that they are controlled by turning the compressor on or off instead of adjusting the compressor's output to match demand. Advanced models such as the highly efficient central air conditioners and heat pumps made by Lennox Industries include two-speed compressors, dual compressors or even continuous speed modulation. Of course, improvements in heat pump efficiency add to the large energy-savings potential this device already offers compared to electric resistance heating.

In residential lighting, various alternatives to ordinary incandescent lights — which waste 80 to 90 percent of the electricity they consume as heat — are now available. "Circlite" or "circline" fluorescent light fixtures which screw into conventional light sockets use from 50 to 65 percent less energy than incandescent bulbs of equivalent light output. However, they have limited applicability because they are much larger than ordinary bulbs. Compact flu-

The heat-pump water-heater began a new era in efficient home hot-water heating. The top-rated Therma-Stor, made by DEC International, saves about two-thirds of the electricity which a conventional electric hot-water heater would use. Although the Therma-Stor costs about $1,500 it is a much better investment for a typical household than a savings account or money-market fund. And the savings are above inflation and tax-free.

TABLE I. Comparison of Highly Efficient and Typical Models for Major Electrical Products

Product	Efficiency Parameter	Efficiency of Typical Models Sold in 1980	Highly Efficient Models Available in 1982	Efficiency of Top Models Available in 1982
Electric heat pump	Heating coefficient of performance (COP)	1.7	Rheem/Ruud RPGA and UPGA series	2.6
Central air conditioner	Seasonal energy-efficiency ratio	7.6	Lennox Landmark IV Series, HS-14	14.0
Room air conditioner	Energy-efficiency ratio	7.0	Carrier FEA 7091	11.0
Electric water heater	Overall coefficient of performance	0.78	DEC International Therma-Stor heat-pump water-heater	2.2
Top-mount refrigerator/freezer with automatic defrost (16-18 ft.^{3})	Annual kWh	1,320	Amana TSC-18E	870
Upright freezer with manual defrost (15-16 ft.^{3})	Annual kWh	880	Kenmore 22166	760

Source: American Council for an Energy-Efficient Economy.

orescent bulbs with up to 75 percent electricity savings are beginning to be manufactured and marketed by Westinghouse and Philips/Norelco. They are only slightly larger than conventional bulbs and provide "warm light" similar to incandescents.

Highly efficient residential appliances generally cost more than models of average efficiency (see Table II). For electric water heating, the highly efficient heat-pump water-heater is four to five times more expensive than an ordinary resistance water heater. For the high-efficiency central air conditioner, the first cost approximately doubles. On the other hand, the highly efficient refrigerator and freezer are only about 10 percent more expensive than their counterparts of average efficiency.

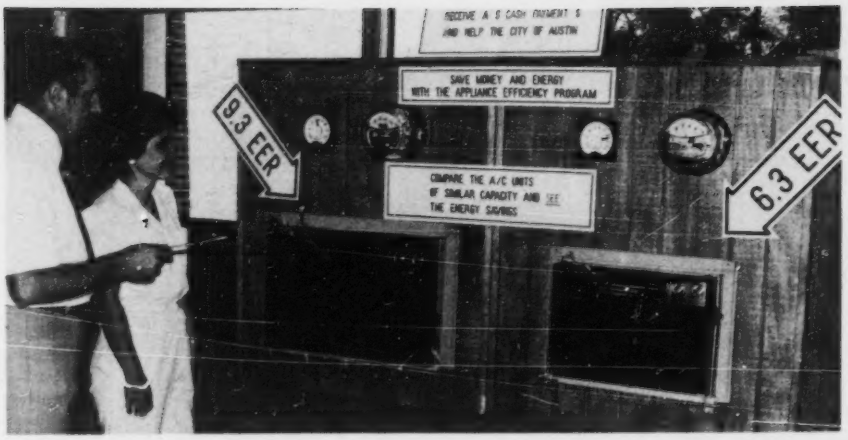
Consider Life-Cycle Cost

In terms of total life-cycle cost, the highly efficient appliances and space-conditioning products turn out to be very good investments, as the higher price is recovered early on by reduced operating costs. Table II shows the payback period and the rate of return on the additional investment for some top models currently available. For this analysis, the top models are compared to equivalent models (made by the same manufacturer in most cases) which have an efficiency similar to the average for products produced in 1980. The calculations were done using average electricity prices and estimated average usage factors.

The payback period on the additional first cost ranges from about two to eight years. On average, the payback period is less than half of the products' lifetime. The extra money spent typically returns from 10 to 58 percent per year in operating cost savings, *above inflation and tax-free*. For comparison, the rate of return above inflation and after taxes for other investment opportunities for individuals (e.g., savings accounts or money market funds) is less than 2 percent per year.

Investing in energy-efficient appliances is also highly desirable from a utility and national viewpoint. Investments in efficient appliances are typically more cost effective than investments in generating capacity and certainly less encumbered with financial and environmental risks. Hence, the capital resources of a municipal utility might be better spent subsidizing and accelerating purchase of highly efficient air conditioners, water heaters, and refrigerators than buying new generating capacity.

If efficient appliances are available and make good economic sense, why don't they dominate the market? First, consumers generally are not aware of the wide range of efficiencies available and the cost effectiveness of more efficient models. Traditionally, the best appliance "buy" is the model which provides the desired amenities at the least first cost.



More than 4,400 customers of the Austin (Texas) Electric Department have purchased high-efficiency air conditioners, heat pumps or alternative water-heating devices for electric water heaters since the city's appliance-efficiency program began in July 1982. Many Austin homebuilders are participating and local dealers are shifting stocks to include only high-efficiency equipment. Here Elmo Miertschin, consumer services supervisor, explains to Janeda Gray, one of the utility's telephone operators, how appliances with higher EERs (energy efficiency ratios) save electricity and money for both the public power system and its customers.
Photo by Bobby Wilder, Austin Electric Department

'The Austin (Texas) Electric Department's rebate covers about one-half the additional cost for the high-efficiency air conditioner.'

TABLE II. **Cost Effectiveness of the Additional Investment for Highly Efficient Products**

	Increased First Cost Compared to Standard Model (1982 $)	Payback Period (yrs.)	Real Return on Additional Investment (%/yr.)
Rheem/Ruud RPGA and UPGA heat pump	650	7.5	10
Lennox Landmark IV central air conditioner	1,000	6.9	11
Carrier FEA 7091 room air conditioner	140	5.7	17
DEC International heat pump water heater	1,200	7.1	12
Amana TSC-18E refrigerator/freezer	100	3.2	34
Kenmore 22166 upright freezer	40	1.9	58
G.E. 22-W Circlite fluorescent light	15	4.3	22
Westinghouse 28-W compact fluorescent light	21	4.8	10

Source: American Council for an Energy-Efficient Economy. Cost data obtained from dealers and contractors in the Washington D.C. area.

Beginning in 1980, federal law called for efficiency/energy cost labels on refrigerators, freezers, water heaters, dishwashers, clothes washers and room air conditioners. While the labels do give consumers some information needed to make economical appliance choices, they do not tell consumers which models are the most efficient, nor do they address the life-cycle cost issue.

Builders Lack Incentives

A second problem is that many appliances and space-conditioning products are purchased by builders, contractors and landlords. These parties do not pay the operating costs and thus have little incentive to buy more expensive, energy-efficient equipment.

Consumers looking for a replacement air conditioner, water heater, or refrigerator are usually concerned with restoring their service as rapidly as possible. They shop in haste, paying little attention to efficiency or operating cost. The consumer often accepts whatever the seller or contractor can deliver immediately. Even for the purchaser who considers operating cost, other factors — such as convenience, design features, appearance, advertising and durability — may play a more prominent role in the purchase decision.

Some state and federal agencies have established programs to encourage purchase of energy-efficient appliances. The federal labeling program has been mentioned already. California and a few other states

'DOE's "no standard" standards may prevent or deter states from maintaining or adopting their own energy efficiency standards.'

have instituted minimum-efficiency standards prohibiting sale of energy-guzzling appliances. California officials say these standards have already eliminated the need for one power plant, thus helping hold down electricity costs.

Standards are particularly important for preventing builders, contractors and landlords from purchasing inefficient products. Federal law requires minimum efficiency standards for the nation, although the prospect for meaningful standards has been dimmed by the Reagan administration. The Department of Energy has proposed and begun to implement "no standard" standards which place no restrictions on the efficiency of residential products. Unfortunately, this policy may also prevent or deter states from maintaining or adopting their own standards, thus undermining their efforts to help consumers obtain energy-conserving and cost-effective products.

What Utilities Are Doing

A number of public and private utilities recognize the opportunity for conserving energy and avoiding new energy supply facilities by stimulating purchase of efficient appliances. At least 20 utilities offer rebates to purchasers of relatively efficient residential equipment. Rebate programs are concentrated in southern states such as Texas and Florida where peak summer demand due to residential air conditioning is a major problem. Hence, air conditioners and heat pumps are the most popular products for rebates. A number of municipal utilities, including some in Illinois, Nebraska, Texas and California, sponsor rebate incentives.

The Austin (Texas) Electric Department's impressive rebate program includes air-conditioner and heat-pump rebates based on size and efficiency of the unit, credits for downsizing cooling equipment, and dealer incentives. For the most efficient central air conditioner, the utility pays $180 per ton of capacity, which works out to around $500 for a typical single-family house. This is three times the rebate offered for the minimum qualifying efficiency, and it covers about one-half the additional cost for the high efficiency unit. Dealers also receive $20 for selling a qualifying unit and the Electric Department offers $45-$125 rebates for heat pump, heat recovery and solar water heaters. For the first six months of the program, the utility estimated a peak demand savings of 1.4 MW at an average cost of $260 per kW.

Springfield (Ill.) City Water, Light and Power offers from $25 to $100 to customers purchasing room air conditioners with an energy efficiency rating (EER) of at least 8.0 and central air conditioners with a seasonal energy efficiency ratio (SEER) of at least 8.5. With these relatively low rebates, the cost of saved capacity is only about $50/kW. The utility estimates the rebate program could reduce its peak demand by 15 to 20 MW by 1992. This would cut projected peak demand growth approximately 20 percent, delaying the need for buying additional $1,000-per-kW generating capacity. The program may expand to other equipment and to the commercial sector.

Last October the Sacramento (Cal.) Municipal Utility District (SMUD) began a conservation incentive program which includes rebates to builders who install efficient central air conditioners and heat pumps in new housing. Builders receive $100 per kW of load reduction, with the kW savings for different efficiency levels estimated from computer simulations of typical buildings. SMUD is also considering rebates for the replacement market and for efficient lighting.

Many electric utilities provide financing for residential weatherization measures such as adding ceiling or wall insulation and storm windows. Some offer subsidized, low-interest loans. It makes sense to include highly efficient equipment in a utility financing program since, for major appliances, the most efficient models can cost up to $1,000 more than average models. Readily available and/or subsidized financing could help overcome the resistance many consumers have to making this extra investment. (Editor's Note: APPA is collecting information on utility financing of end-use equipment. For more information write Karen Anderson at APPA.)

The Tennessee Valley Authority (TVA) offers financing for residential energy efficiency measures including heat pumps and, beginning in October 1982, heat pump water heaters (HPWH). Loans for these products, offered through the local utilities, are generally issued at the market rate available to the power authority. This is considerably below standard consumer borrowing rates. In the first month of the HPWH offer, more than 40 local utilities agreed to participate in TVA's program.

What Else Should be Done?

- Rebate incentive programs appear to be cost effective for utilities, with the benefits of investments in end-use efficiency shared

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by purchasers and ratepayers in general. Only a small fraction of the nation's publicly and privately owned utilities now offer rebate programs. Institution of rebate programs on a national scale could result in substantial savings. If half the central and room air conditioners purchased in the next 20 years qualify for rebates, total savings in electric demand could be 18,000 MW, equivalent to the delivered power from 30 large power plants.

- It may be useful to target rebates at those who play a major role in product selection but do not operate the equipment — builders, rental property owners, and heating, air conditioning and plumbing contractors. In addition, widely available financing for high first cost products at attractive interest rates should be helpful.
- Although initial results of rebate programs appear encouraging, more analysis is desirable. In particular, there is a need to evaluate the *incremental* quantity of purchases of high-efficiency equipment after rebates begin, the cost per saved kW or kWh from *incremental* purchases of high efficiency equipment, and rebates' effect on total product sales and use.
- Early retirement of inefficient products and replacement with highly efficient models can be cost effective for consumers even without a subsidy. Utilities could promote this practice and, if necessary, provide some added financial incentives. For example, Pacific Gas and Electric Co. pays customers $25 to donate older or underused refrigerators to a charity. The charity is given $20 if it makes the unit inoperable. This helps remove inefficient refrigerators from the operating stock.
- Many utilities and private firms perform energy audits in existing residences. Sometimes they examine space- and water-heating equipment and, if necessary, recommend or perform a furnace "tune-up" or water-heater insulation wrapping. An auditor could also provide homeowners appliance rating sheets indicating appliance efficiency and the cost effectiveness of replacement with highly efficient models. It may take some time for the efficiency ratings of air conditioners and other appliances to become as well understood as automobile miles per gallon, but it is a necessary step toward a more efficient marketplace.
- Consumers are not the only group in need of information on energy-efficient equipment. Utilities require techniques and data for integrating efficient appliances into their planning models. Utility officials need information on appliance program costs and benefits including energy savings, participation levels, and the impact of efficient appliances on demand.

'Efficiency ratings of air conditioners and other appliances need to become as well understood as automobile miles per gallon.'

In summary, a massive shift to energy-efficient residential equipment will require somewhat new perspectives on the part of both consumers and utilities. Consumers need to view equipment as investments with an emphasis placed on the life-cycle cost. Utilities need to view themselves broadly as "energy service" organizations — helping their customers obtain service (not electricity or fuel) at the least cost. This new perspective is well-recognized by APPA. (See "Strategies for the Future," by Alex Radin, November-December 1982 PUBLIC POWER, p. 6.) Moreover, through its Demonstration of Energy-Efficient Developments (DEED) program and other means, APPA could assist publicly owned utilities which want to move in this direction by implementing appliance-efficiency programs. Everyone stands to gain.

$46,000,000

Southern Minnesota Municipal Power Agency

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Morgan Guaranty Trust Company *of New York*

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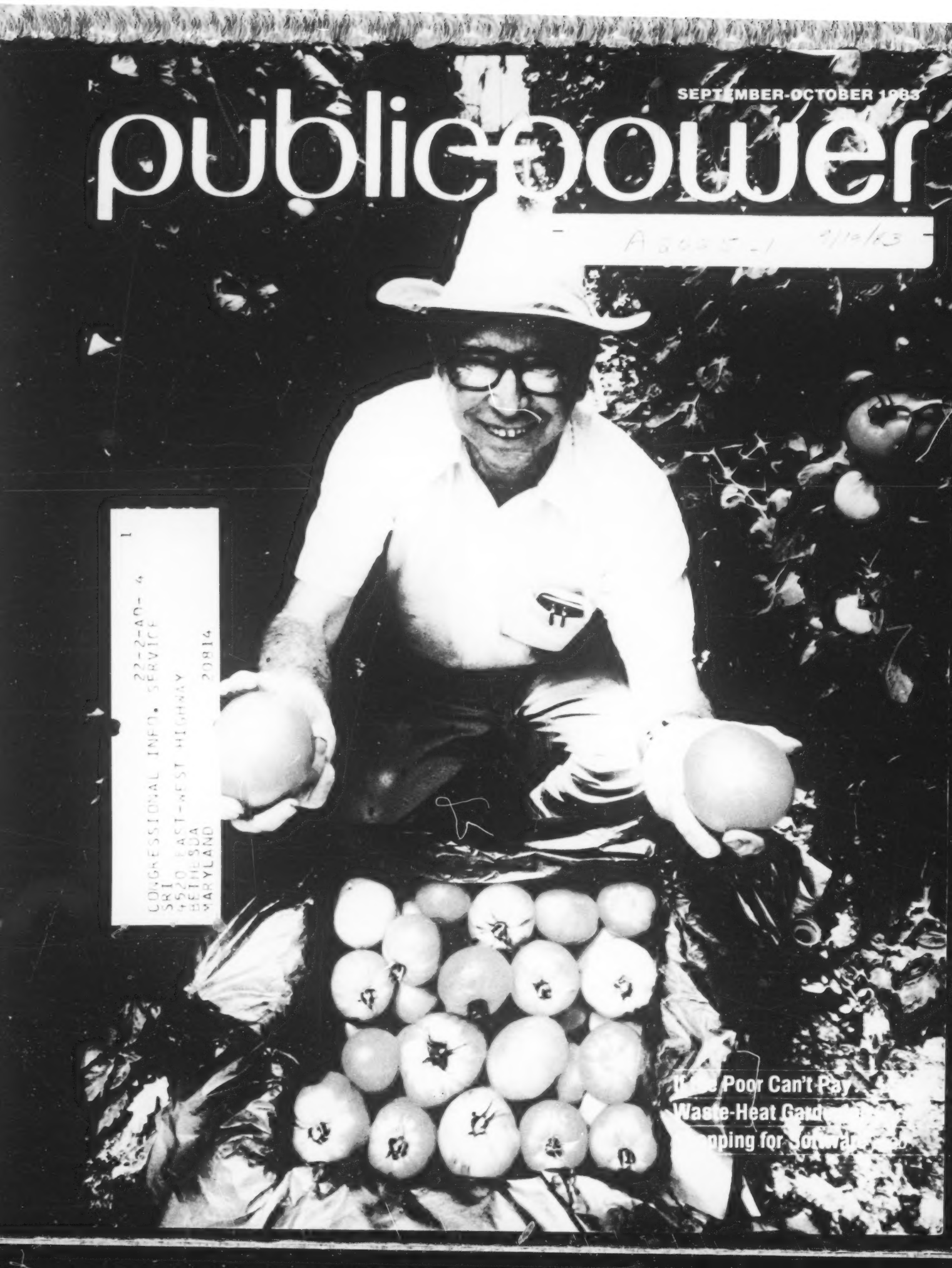

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Waste-Heat Gard

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Photo by I. Wilson Baker

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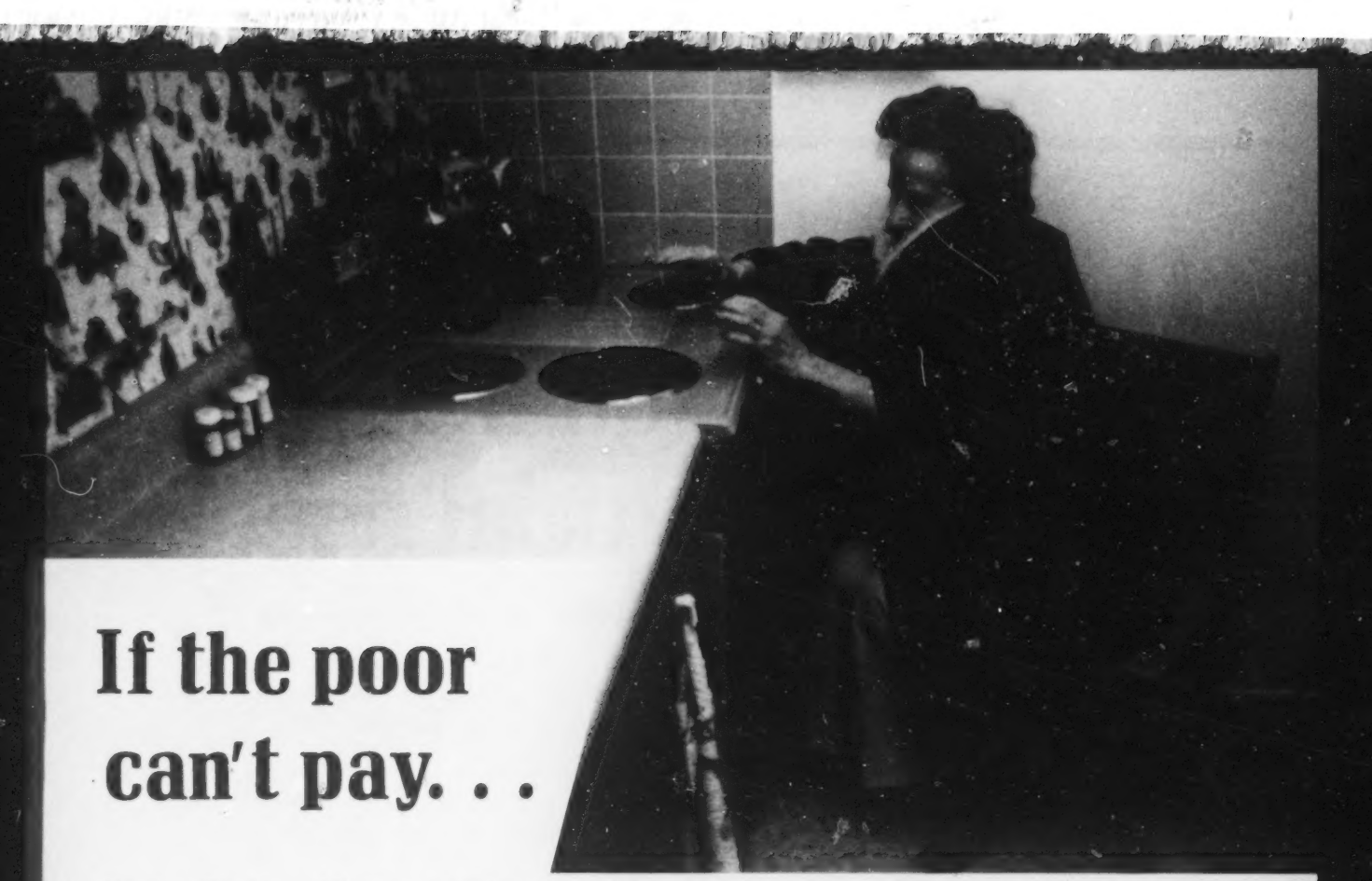
PUBLIC POWER *is the official publication of the American Public Power Association. Opinions expressed in signed articles are those of the authors and not necessarily policies of* APPA. *For permission to reprint articles write or call the publisher.*

Editorial Office: 2301 M St. N.W., Washington, D.C. 20037. 202/775-8300

Advertising manager, W. E. (Trez) Lee; *Assistant advertising manager,* Peggy Douglas; *Circulation manager,* Margaret I. Winfough; *Classified advertising manager,* Barbara Opicka; 2301 M St. N.W., Washington, D.C. 20037. 202/775-8300

PUBLIC POWER is published bimonthly. Second-class circulation postage paid at Washington, D.C. Subscription Rate: $25 per year; single copy $5; Jan.-Feb. Directory Issue $20.

PUBLIC POWER is a member of Business Publication Audit of Circulation, Inc. (BPA) and the Society of National Association Publications (SNAP). (USPS-449-420)



If the poor can't pay. . .

Mounting utility customer debt points up a growing crisis, especially among low-income persons, as another heating season approaches.
Photo by College of Public and Community Service, University of Massachusetts, Boston.

by JOEL F. EISENBERG, MEG POWER and JERRY L. PFEFFER

LAST WINTER THE MEDIA focused on problems faced by growing numbers of households entering the winter heating season without utility service because of nonpayment of bills. More recent articles have noted the mounting level of debt accumulated by even larger numbers of residential customers, who face termination once recently enacted legal protection against winter shutoffs begin to lapse.

In response to these concerns, linked in many cases to escalating natural gas prices, several states issued new emergency orders prohibiting shutoffs during the heating season. These emergency orders were in addition to moratoria on service terminations during the winter months which had previously been enacted in many states or adopted on a voluntary basis by utilities.

Power and Eisenberg, partners in an Arlington, Va. energy and regulatory policy consulting firm, previously served in senior congressional staff positions. Pfeffer is executive vice president of NPS Energy Management, Inc., a New York- and Washington-based economic and financial consulting organization serving the utility and energy industries. He previously served as assistant administrator for utility systems in the U.S. Department of Energy.

Escalating natural gas prices following enactment of the 1978 Natural Gas Policy Act are the principal cause of delinquent utility bills and service terminations. Natural gas prices increased 144 percent from 1977 to 1982. Over the long term, however, the growing problem of service terminations and bad debt is comparable for both electric and gas residential service.

(See related column, "Are Your Policies Fair to the Poor?" p. 80.

Not only are electricity prices also steadily rising: many households whose gas service is terminated turn to more costly electric space heating. Their inability to pay for gas is soon reflected in inability to pay dramatically increased electric costs. In simple terms, the problem is common to all energy forms and stems from rising fuel prices and the lack of adequate financial resources in a growing number of households, a problem exacerbated by economic recession and unemployment.

Termination Data Unreliable

No reliable information is available on the critical dimensions of the residential service termination problem. Only Pennsylvania has comprehensive statewide data showing how many terminated residential accounts represent households still desiring reconnections. Not a single state or major utility knows exactly how many terminated customers find ways of receiving service under alternate account names or join the increasing ranks of desperate customers involved in theft of service. Few utilities have tried to determine the ability to pay among terminated accounts seeking reconnection.

Since many utilities and regulatory commissions do not maintain long-term records of terminations and subsequent reconnections, it is difficult to estimate whether the number of households whose service is terminated without subsequent reconnection is changing over time. For example, a recent study of several natural gas utilities in those states hardest hit by natural gas price increases showed a 46 percent increase in service terminations between 1980 and 1982, and a very slight decrease in the percentage of those households which were subsequently reconnected.

The dramatic problem of service terminations has disguised even more alarming trends in delinquent accounts. Mounting utility customer debt points to a coming crisis; in a growing number of households cumulative debt to electric and gas utilities exceeds long-term ability to pay.

For example, a recent survey of delin-

quent bills and moratoria was published in late 1982 by the Edison Electric Institute (EEI) and American Gas Association (AGA). The study examined the scope of the problem in 34 utilities in as many states and determined that 24 of the 34 companies experienced a significant increase in their ratios of net uncollectibles to revenues between 1977 and 1981.

Winter Shutoffs Limited

Over the past few years, virtually all public utility commissions have addressed the service termination issue. The majority restricted utility curtailments of electric and gas service to residential customers during the winter months (typically defined as Nov. 15 to April 15).

In many cases, these actions were linked to proceedings first initiated under Title I of the Public Utility Regulatory Policies Act of 1978 (PURPA) which required state commissions and nonregulated utilities to *consider* a number of regulatory standards, including one on procedures relating to service termination. Additional moratorium regulations are under study by commissions or legislatures in other states and in Congress.

The stated purpose of these restrictions is prevention of hardship, illness and even death when cold weather threatens the health and welfare of highly vulnerable populations, such as the elderly living on fixed-incomes. In most states such restrictions offer less than absolute protection.

For example, some rules apply only during periods of unusually low temperatures. Others permit utilities to establish the terms of notification and repayment plans; still others permit termination only after notice to and/or approval of the local regulatory agency. Most states guarantee customers an extended opportunity to dispute reasons for termination and negotiate a solution to payment problems with their utility *prior* to termination.

Regulatory Solutions Questioned

Questions as to whether existing moratorium provisions are equitable, cost-effective and adequate to protect those most in need have been raised both by utilities and consumer groups. Several significant issues regarding the financial consequences of "blanket" termination moratoria, shutoff and reconnection guidelines and other consumer protection provisions are involved.

For example, many electric and gas companies contend absolute restrictions on shutoffs that do not consider customer ability to pay are a principal cause of their growing number of delinquent accounts. They note that mounting uncollectibles are adversely affecting the large percentage of residential ratepayers who manage to keep their accounts current and must absorb the growing burden of bad debt. Both electric and gas utilities suspect some customers able to pay are taking advantage of moratoria and thus imposing unjustified costs on other customers. In the survey conducted by EEI and AGA, more than 50 percent of the companies responding reported a pattern of worsening bad debt, from 1979 to 1981, which they attributed in part to state-imposed moratorium regulations.

Consumer representatives, on the other hand, are concerned that if the numbers of delinquent accounts and bad debts continue to escalate, the large majority of customers who *do* pay their bills may create political pressures which will ultimately force elimination of such subsidies even though certain low-income customers need protection.

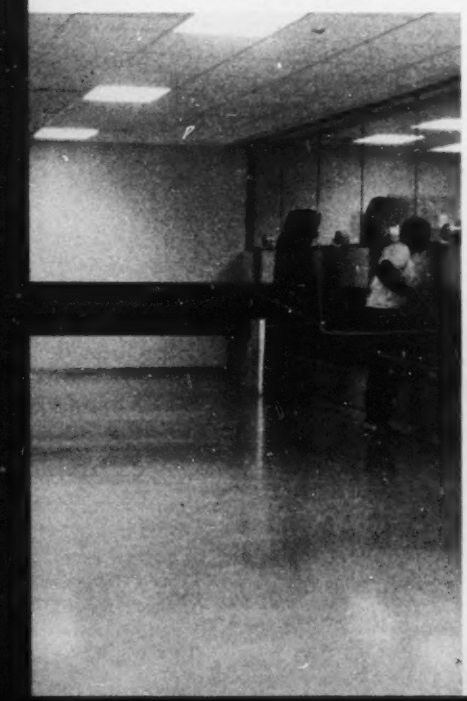
Additionally, when the moratorium ends many of the most vulnerable customer groups, such as the elderly and poor, still lack funds to pay delinquent accounts. They thus risk termination of service from the end of the winter through the start of the next moratorium. This may occur even when the moratorium is linked to low-income energy assistance and other social welfare and public assistance mechanisms (a linkage not readily apparent in many jurisdictions).

Funding for these assistance programs, which already had failed to keep pace with fuel price increases, has been threatened by federal budget cuts and rising numbers of applicants. Indeed, some regulators and utilities voice concern over a new class of "seasonal customers" — a growing population that remains without service during the warmer months and secures reconnection for the winter season under favorable moratorium rules. This cycle of disconnections and reconnections provides dramatic evidence of the degree to which moratoria alone cannot resolve the problem of growing number of customers unlikely to regain a "current status" on the increasing amounts they owe to electric and gas utilities.

What Payment Is Accepted?

Many states recently issued new rules governing reconnection of service to households which remained disconnected for non-pay-

The typically short line (left) at the window where utility customers pay their bills contrasts sharply with the long line (right) where customers facing disconnection seek help from credit counselors. Photos by Memphis (Tenn.) Light, Gas and Water Division



'Not a single state or major utility knows exactly how many terminated customers find ways of receiving service under alternate account names or join the increasing ranks of desperate customers involved in theft of service.'

ment as winter began. Two questions typically emerged as these rules were considered by regulatory agencies and utilities:

First, how much less than the total amount owed can a utility be required to accept as a condition of providing continued service — in the case of both the customer with a cumulative delinquent account and the customer who simply cannot afford to pay current charges?

Second, how can the rules governing moratoria and reconnections be structured to increase the likelihood the utility eventually receives the full balance due?

While approaches adopted by regulators and utilities vary, the rules generally assume the utility *will* ultimately collect the full amount owed even if extended payment plans are required to secure full payment. Most states permit eventual termination of those customers who fail to comply with the negotiated agreement.

A typical repayment rule, recently adopted in Missouri, requires a customer who cannot pay an overdue account in full to deposit the lesser of $75 or 25 percent of the amount due. The customer can then arrange to pay the balance at the rate of one-eleventh of the outstanding balance per month (plus current usage) on a budget plan extending over 12 months. Customers who fail to meet this extended payment schedule may be terminated *even during winter months.*

In a few states maintenance of service during the heating season is virtually assured. Michigan, for example, requires only 7 percent of the balance due to be paid. Pennsylvania requires explicit commission approval of each winter termination, even where a customer has violated terms of an extended payment schedule.

Last winter the Kansas State Corporation Commission said terminated customers must be reconnected upon request and demonstration of "good faith." The Kansas commission noted that a good faith attempt included: notifying the utility of the customer's inability to pay in full; application by the customer for financial assistance (federal, state or local); and paying a minimum of 25 percent of the amount owed for utility service during the most current billing period, or $30, whichever is less. The Kansas reconnection standard, however, does not relieve gas and electric customers of their obligation pay past, current or future charges for utility service.

Several states have sought to link their moratorium programs to the federal low-income energy assistance program. Some have set their minimum reconnection payment requirements at levels comparable to average monthly payments under federal programs. For example, Maine, Ohio and Michigan use federal eligibility as the basis for automatic eligibility for protection under state moratorium rules. In Michigan up to $650 of the eligible household's bill is paid directly to the utility at the end of the moratorium period to assure continuing service.

Day of Reckoning Postponed

Our recent analysis of 10 gas distribution utilities in several eastern and midwestern states with moratoria in effect showed major increases in the number and extent of delinquent residential accounts. Accounts in arrears increased an average of 16 percent over the past two years while those in arrears 60 days or more increased 35 percent. For the 10 utilities examined, the average amount owed increased 88 percent in the same period, to an average of $218 per household.

The utilities involved do not attribute their bad debt problem primarily to regulatory moratoria on service termination. However, these figures suggest *moratoria offer no long-term solution to the underlying economic and social problems reflected in the growing levels of service termination and bad debt. Rather, such regulatory actions provide a short-term remedy while postponing the day of reckoning for both utilities and low-income consumers.*

Newly adopted termination, reconnection and extended-payment rules developed in response to moratoria problems also have unknown impacts. Virtually no data are available on characteristics of customers using extended-payment plans or the plans' relative effectiveness. However, a cursory examination of the numbers relating to a few typical state plans suggests that participating households may not be well served over the long-term by such repayment schemes.

As the accompanying table shows, in no case did the average energy-assistance benefit for 1982-83 cover the total overdue balance accumulated by the average terminated household. These arrearages are those reported by gas utilities for households disconnected for non-payment. This means a low-income household's own scarce resources must cover the costs of all current energy usage plus some portion of the previous year's overdue balance.

Yet, extended payment plans established by state regulatory commissions in the states surveyed typically require the low-income households to allocate more than 10 percent of gross monthly income to utility services. In Minnesota, the average low-income household must dedicate at least 22 percent of income for heating costs alone over the winter months. The (non-heat) electric utility costs must be added to these figures of anticipated energy expenditures and accumulated debt. Clearly, the absolute balances remaining from which the low-income customer must cover essential living costs are unrealistically low.

In summary, it appears that existing regulatory policies have not protected a growing

1982-83 Typical Costs of Natural Gas Reconnection and Payment Plans

Balances Owed to Gas Utility*	OHIO	ILL.	MINN.	WIS	KY.
Average Overdue Balance	$278	$210*	$556	$332	$298*
Down Payment Required on Overdue Balance	93	70	93	200	Negot.
Minimum Monthly Payment Required on Overdue Balance	21	18	43	Negot.	Negot.
Average (current) Winter Monthly Bill**	78	113	134	131	98
Average Monthly Income (Poverty Family of 4)	828	828	828	828	828
Average (1983) Energy Assistance Benefit***	175	183	485	310	223

*Average for all household in arrears.
**1981-82 consumption and arrearage levels; 1982-83 prices.
***Survey by Department of Health and Human Services, March 1983.
Source: Eisenberg and Power, "Energy Debt: The Coming Crisis for the Poor," National Consumer Law Center, Boston, Mass., April 1983.

segment of low-income residential customers from rapidly accumulating debt to energy utilities. For many customers, one cooling or heating season begins before the prior season's debts have been paid, creating a new cycle of disconnects and reconnects.

While most case studies and analyses are based on gas industry data, they have equivalent meaning for both private and public electric utilities. The economic strains on low-income customers attempting to meet their growing utility bills do not distinguish between fuel types and are evident among both electric and gas heating customers.

Munis Can't Shift Responsibility

From a utility perspective, the difficult issue of service terminations and bad debts is magnified when the system is publicly owned and self-regulated. The dual problems of rising energy prices and customer inability to pay do not respect distinctions in system ownership. The utility response to these problems, however, must take on a somewhat different character in the context of a municipal or other government utility.

The initial response of most investor-owned and publicly owned systems to customers' inability to pay rising energy prices is to seek a negotiated solution in the form of extended payment plans. For low-income customers, however, some form of financial assistance from a combination of public and private sources may be crucial. The investor-owned utility may serve as a "referral agency" to such assistance programs, but feels that the responsibility for meeting essential customer needs must ultimately shift to local government.

'Participating households may not be well-served over the long term by typical extended-payment schemes.'

The publicly owned system, however, is in a considerably more difficult position since it *already is a governmental entity* and cannot evade ultimate responsibility by shifting the problem to the public sector. The argument that "social welfare and low-income assistance is not *our* business" is much less credible when voiced by a publicly owned system.

The issue has little to do with the fact that such systems are independent agencies of the municipality, must operate in a "businesslike manner," or must be financially self-sustaining. Rather, in a political sense, the ultimate responsibility for meeting essential customer needs may be vested by default with the municipal power system if other agencies or government fail to act on a timely basis to provide supplemental assistance to low-income customers threatened with shutoffs. This reality was illustrated this past winter in Seattle, Wash., (which has no statewide termination moratoria). After growing numbers of shutoffs and critical media coverage, the mayor of Seattle intervened and directed the management of the municipal utility system to review each case personally and ease credit policies.

Rapidly escalating gas prices may foment more citizen protest than electric rate increases do, but the economic strains on low-income customers are evident among both electric and gas heating customers. Photo by Citizen/Labor Energy Coalition

While the shutoff problem has been especially severe among gas utilities, electric power systems, especially the large number of publicly owned systems in the Tennessee Valley and Pacific Northwest, will soon confront similar difficulties. Utility customers in both regions face several problems:

- rapid escalation in electricity prices resulting from the cost of new thermal power plants;
- a relatively high percentage of electric resistance and space heating systems;
- poorly insulated homes linked to historically low electricity prices;
- high levels of poverty and unemployment which have worsened as a result of the recent economic recession; and
- reduced levels of federal welfare benefits and pressures on states to maintain program funding even at existing levels.

Conservation and home weatherization programs are helpful in reducing monthly energy costs but will be inadequate, in most cases, to deal with the underlying problem of growing customer inability to pay rising energy bills.

Options for the Future

There is sufficient experience with alternative moratorium and repayment systems to evaluate their effectiveness in protecting the most vulnerable households. The effect of alternative eligibility criteria and termination-reconnection rules on delinquent accounts can also be assessed to guide both regulators and utility collection departments in the design of such measures.

Utilities' consumers-service and account-collection practices should also be reviewed to determine the most effective approach for securing a steady flow of payments from even those households experiencing severe economic stress. For example, on the basis of an extensive internal analyses of service termination and debt collection problems performed in 1980 and 1981, the Pennsylvania Public Utility Commission has been urging utilities subject to its jurisdiction to modify collections practices. Officials in that state contend that early, frequent and clear notification of overdue balances and minimal use of terminations as a routine collection practice are associated with lower numbers of accounts in arrears and a reduction in uncollectible revenues. Similar findings, albeit in a less formal sense, have also been noted by many of the nation's smaller public and cooperative systems. These findings and those of other analytic studies recently completed deserve serious consideration in other jurisdictions.

'The publicly owned system is already a governmental entity and cannot evade ultimate responsibility by shifting the problem to the public sector.'

Funds for low-income energy assistance must be expanded. All major electric and gas utility trade associations have supported continued funding for the federal low-income energy-assistance program which provides aid either in direct cash assistance or payments to utilities and fuel vendors. This program is currently funded at nearly $2 billion annually.

Many utilities, however, have recognized the insufficiency of even these programs in the context of the overall problem and have sought to expand the pool of available resources. Some have made direct contributions and solicited local agencies providing emergency energy assistance to low-income ratepayers.

For example, public power systems in such diverse areas as Memphis, Tenn., Tacoma, Wash., and McPherson, Kan., have programs where ratepayers can contribute through their utility bills to local charities providing low-income energy assistance. Some utilities have provided direct cash contributions or matching assistance to funds contributed by ratepayers. Investor-owned utilities in Maryland, Missouri and Arkansas have actively solicited funds from the local business community to supplement resources available from federal low-income assistance programs.

Some utilities seek expanded rate discounts (e.g., lifeline rates) offered in some jurisdictions to low-income customers. For example, a Rhode Island electric utility has requested regulatory approval to offer discount rates to customers who have lost their jobs and exhausted their unemployment benefits. West Virginia recently enacted a statewide 20 percent discount in electric and gas rates during the winter months for low-income customers. Funding for the West Virginia program will come from state tax revenues and appropriated funds rather than directly from utility revenues.

The utility industry and state regulators must find new ways to expand the long-term availability and adequacy of financial assistance for that growing number of households which cannot pay for adequate energy supplies from their own resources. Moratoria alone are necessary but insufficient to deal with the problem. The alternative to adequate public assistance is to impose an increasing financial burden on the utility system and its other customers, where a majority of ratepayers are forced to pay the bills for a growing minority who don't.

Reflecting the growing concern and frustration with this issue, the Michigan Public Utilities Commission noted in an emergency order adopted in November 1982:

"The commission would be remiss if it did not make mention of the failure of the legislative end of the federal government to provide adequate protection for economically disadvantaged citizens. . . . The commission, acting within the scope of its authority, can only require the implementation of quick-fix, band-aid solutions to these problems when it is clear that the legislative process has failed . . ."

The long-term solution is uncertain. What is clear, however, is that the problem may soon reach crisis proportions unless new and innovative approaches are successfully adopted through joint efforts of utilities and responsible government agencies.